

# Engineering Data

## Stromberg-Carlson No. 260 Radio Receivers

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY  
Rochester, New York

### ELECTRICAL SPECIFICATIONS

Type of Circuit	Superheterodyne with Automatic Frequency Control
Tuning Ranges	{ A—530 to 1600 Kc.; B—1600 to 4800 Kc.; C—4800 to 11,000 Kc. D—11,000 to 22,000 Kc.; E—22,000 to 60,000 Kc.
Number and Types of Tubes	{ 5 No. 6K7; 1 No. 6A8; 2 No. 6J7; 2 No. 6H6; 1 No. 6C5; 1 No. 6Q7; 2 No. 6L6; 1 No. 6G5; 1 No. 5U4G
Input Voltage Rating	105 to 125 Volts, A. C.
Power Frequency Rating	25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating:	
No. 260-L	185 Watts
No. 260-P	260 Watts
Frequency of Intermediate Amplifier	465 Kilocycles

### APPARATUS SPECIFICATIONS

No. 260-L	50 to 60 Cycles; P-27992 Chassis; P-26170 and P-27827 Loud Speakers
No. 260-LB	25 to 60 Cycles; P-27993 Chassis; P-26170 and P-27827 Loud Speakers
No. 260-P	60 Cycles Only; P-27992 Chassis; P-26170 and P-27827 Loud Speakers; No. 7 Automatic Phonograph Unit
No. 260-PB	25 Cycles Only; P-27993 Chassis; P-26170 and P-27827 Loud Speakers; No. 7-B Automatic Phonograph Unit

### CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 260 Radio Receivers are 16 tube "Adjustable High Fidelity" receivers and are equipped with an Automatic Frequency Control (A. F. C.) Flash Tuning Circuit. This circuit is operative only in the Standard Broadcast Range and the mechanical arrangement is such that seven favorite broadcast stations may be set up on the Flash Tuning Unit. (Local and other stations that give the best daytime and evening service should be selected).

With the A. F. C. knob (located on the front of the panel) rotated to the "on" position, any one of these favorite stations may be easily selected; as the station selector knob is rotated, each lamp located behind one of the call letters of the stations set up in the Flash Tuner Unit will flash "on" whenever the receiver is tuned to the frequency of these stations. Between any of these stations no noise will be heard from the receiver while operating the Flash Tuning System. To properly set up the A. F. C. Flash Tuning System read the section, "Instructions for Setting Up the A. F. C. Flash Tuning System" appearing on page 8 of this book.

In tuning this receiver (with the A. F. C. control knob rotated to the "off" position) resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle. The strength of a received signal may be determined by observing the size of the aperture appearing on the target of the tuning indicator tube. The stronger a received signal, the greater the reduction in the size of the aperture.

There are five tuning ranges in these receivers. The Short-Wave Foreign spectrum is divided into two ranges in these receivers. Maximum selectivity between adjacent stations located in the Standard Broadcast Range is obtained by the use of an additional tuned radio frequency ("Bi-resonator") circuit. When any of the other ranges are in operation, this additional tuned circuit is cut out of the receiver circuit. When either the Aircraft or Short Wave ranges are in operation the receiver functions as a three-gang tuning capacitor receiver, and when the Ultra-Short Wave range is in operation the receiver functions as a two-gang tuning capacitor receiver. When reception conditions warrant, the fidelity of these receivers can be increased by rotating the "Tone-Fidelity" control knob in a clockwise rotation from the "Normal" position of this control. High fidelity reproduction is obtained by rotating this knob in a clockwise direction to the desired degree from the normal position of this control.

These receivers are also equipped with the Stromberg-Carlson Acoustical Labyrinth, a device which extends the bass response, provides reproduction only from the front of the cabinet, and eliminates all cabinet resonance. Audio reproduction is further improved in these receivers by employing sound diffusing vanes in front of the opening for each loud speaker which distribute the higher pitched tones, thereby providing excellent reproduction in all parts of the room by spreading out these directional frequencies. In order to make efficient use of the large available audio power output obtainable from these receivers, two Carpinchoe high fidelity loud speakers are used. The maximum undistorted power output of this receiver is 20 watts when working into the loud speakers supplied with his receiver (P-26170 and P-27827 loud speakers). The voice coil impedance of each of these speakers is 1-½ ohms. The field coil resistance of the P-26170 speaker, when cold, is 1,050 ohms, and the field coil resistance of the P-27827 speaker, when cold, is 3,425 ohms.

These receivers are also provided with a low level bass frequency compensating circuit, which in conjunction with the volume control circuit, operates so that balanced reproduction is obtained for any setting of the volume control. A "Bass" control is also provided to increase the response at the lower (bass) audio frequencies if desired when operating at medium or low volume levels.

In addition to the above features, a "full power quality" control circuit arrangement (distortion limiter) is also provided in these receivers which operates automatically to prevent distortion when operating at maximum audio power.

A metal guard frame is furnished on these receivers to prevent damage to the chassis components and also to facilitate ease of servicing should this become necessary. Do not turn the chassis over on its guard frame without first removing the tuning indicator unit which is secured to the metal guard frame. To remove the tuning indicator unit from the guard frame, first unscrew the knurled screw which holds the tuning indicator's clamp to the metal guard frame, which will then allow the tuning indicator unit to be removed from the guard frame.

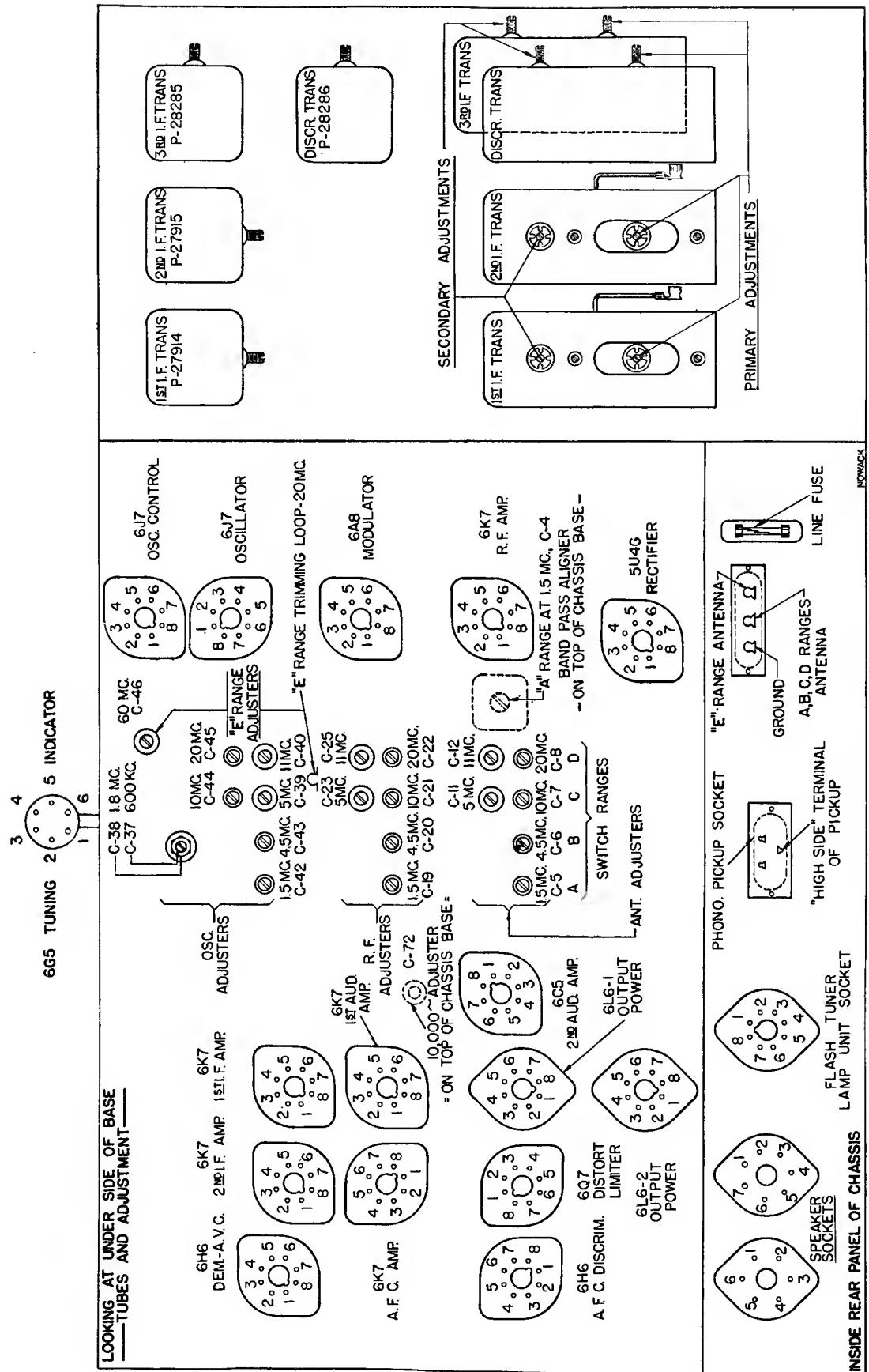


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Adjustments.

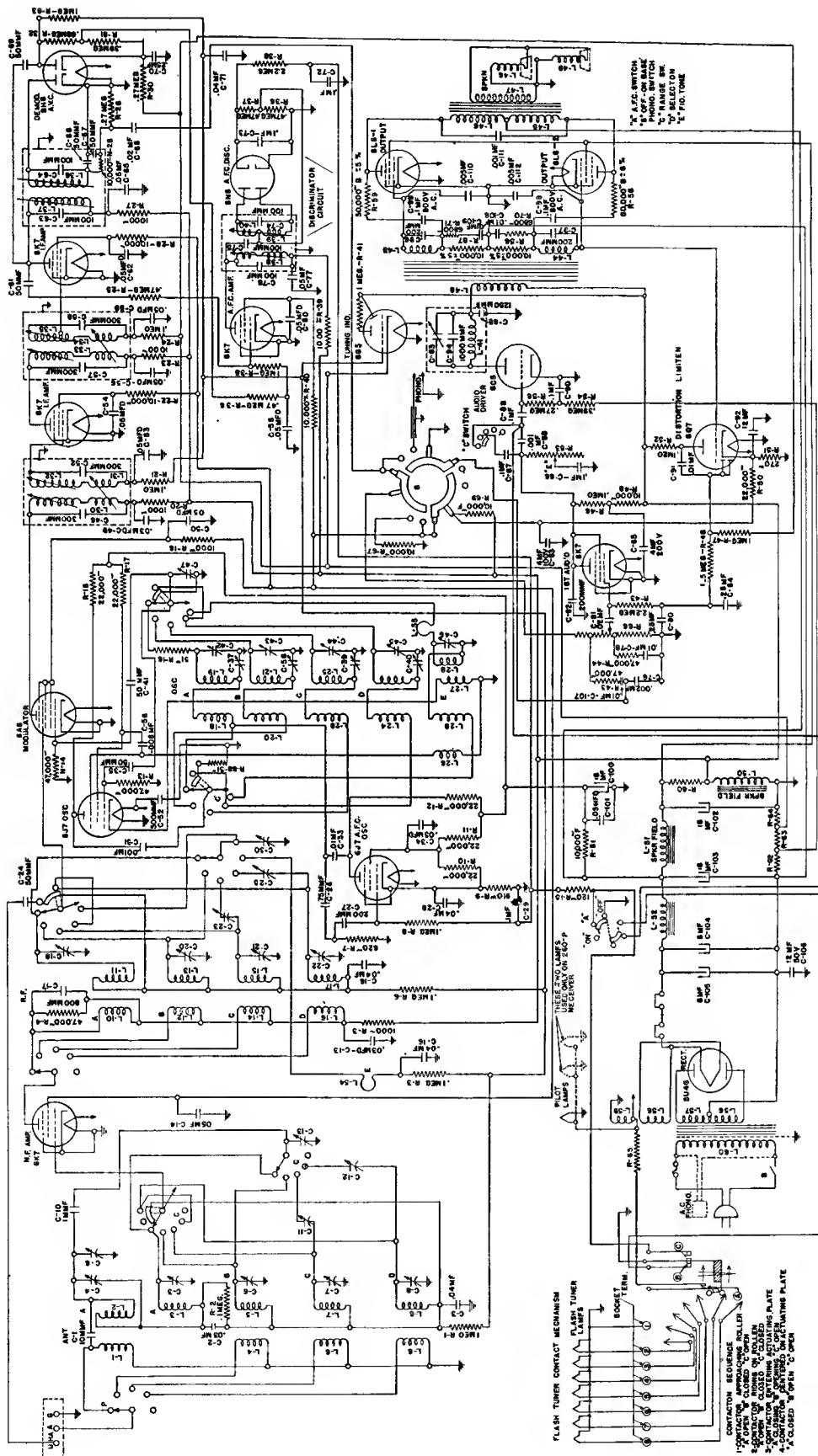


Fig. 2. Schematic Circuit.

A Stromberg-Carlson No. 7 Multi-Record, Automatic Changer, Phonograph Unit is also supplied in the No. 260-P Receivers. This unit is equipped with a crystal type pickup which operates in conjunction with a specially equalized circuit.

A socket having three contacts is provided on the rear of the chassis base of the No. 260-L Receiver, and is wired to the "Off-On-Bass-Phonograph" switch assembly, the control knob of which is located on the front of the receiver. A three-prong plug is also inserted in the socket so that if at any time it is desired to use an electric pick-up and phonograph unit in conjunction with this receiver, it may readily be accomplished. See section, "Procedure for Obtaining Reproduction from Phonograph Records".

The various tubes are used in these receivers as follows: One No. 6K7 tube is used in the R. F. Amplifier; two No. 6K7 tubes are used in the I. F. Amplifier; one No. 6K7 tube is used in the Automatic Frequency Control Amplifier; and the remaining No. 6K7 tube is used in the Audio Amplifier. The No. 6A8 tube is used as the Modulator tube. One No. 6J7 tube is used as the Oscillator tube, and the other No. 6J7 tube is used in the Oscillator Control Circuit for Automatic Frequency Control. One No. 6H6 tube is used as the Demodulator—A. V. C. tube, and the other No. 6H6 tube is the Discriminator tube for the Automatic Frequency Control Circuit. The No. 6C5 tube is used as the Audio Driver tube of the Audio Amplifier. The No. 6Q7 tube is used in the "Full Power Quality" control circuit (distortion limiter). The two No. 6L6 tubes are used in the Audio Power Output Stage. The No. 5U4G tube is the Rectifier tube of the Power Supply Unit, and the No. 6G5 tube is used for indicating resonance in the Tuning Indicator System.

### NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Tube	Circuit	Cap	Terminals of Sockets								Heater Voltages Between Heater Terminals	
			1	2	3	4	5	6	7	8	Socket Terminal Numbers	Volts
6K7	R. F. Amp.	0	0	0	+235	+90	0	+85	6.3	0	2-7	6.3
6A8	Modulator	0	0	0	+235	+85	-1.8	+85	6.3	0	2-7	6.3
6J7	Oscillator	0	0	6.3	+80	+185	0	0	0	0	2-7	6.3
6J7	Oscillator Control	0	0	0	+195	+115	+5.8	0	6.3	+5.8	2-7	6.3
6K7	1st I. F. Amp.	0	0	0	+235	+75	0	+92	6.3	0	2-7	6.3
6K7	2nd I. F. Amp.	0	0	0	+235	+75	0	+92	6.3	0	2-7	6.3
6H6	Demodulator —A. V. C.	—	0	0	-0.2	0	0	-1.4	6.3	0	2-7	6.3
6K7	A. F. C. Amplifier	0	0	0	+235	+75	0	+92	6.3	0	2-7	6.3
6H6	A. F. C. Discriminator	—	0	0	-0.2	0	-0.2	-0.2	6.3	0	2-7	6.3
6K7	1st Audio Amp.	0	0	0	+48	+48	0	-1.4	6.3	0	2-7	6.3
6C5	Audio Amp. Driver	—	0	0	+220	-0.1	-0.1	—	6.3	0	2-7	6.3
6Q7	Full Power Quality Control	0	0	0	+165	0	0	-20	6.3	+1.0	2-7	6.3
6L6(No. 1)	Audio Output	—	0	0	+400	+275	-22	—	6.3	0	2-7	6.3
6L6(No. 2)	Audio Output	—	0	0	+400	+275	-22	—	6.3	0	2-7	6.3
6G5	Tuning Indicator	—	6.3	+15*	-1.4	+240	-2.5	0	—	—	1-6	6.3
5U4G	Rectifier	—	0	+410	—	420	—	420	—	+410	2-8	5.1
Speaker Socket (6 Prong)		—	+245	—	+410	+410	0	0	—	—		
Speaker Socket (7 Prong)		—	+505	0	0	+415	+415	—	+270	—		

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. Voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

## ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscilloscope and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts. It will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of either loud speaker. In addition to this equipment, it will be necessary when making an adjustment of the "Discriminator" tuned circuits to use a milliammeter having a range of 0-10 milliamperes connected in series with the cathode of the No. 6J7 oscillator control tube by means of an adapter plug inserted between the tube and the socket. The leads to the meter should not be any longer than 15 inches and should be shunted at the socket connections by a capacitor of not less than 0.25 mfd. A high resistance voltmeter having a resistance of at least 1000 ohms per volt will also be needed when making an adjustment of the "Discriminator" tuned circuits.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

Before proceeding with the alignment of any circuits in these receivers, except when specifically directed, be sure that the Fidelity Control knob is set for the "Normal" position and that the Automatic Frequency Control knob is set to the "Off" position. The "Off-On-Bass-Phonograph" Control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed in these instructions. Figure 1, shows the location of all the aligning capacitors or adjustments for these receivers. It will not be necessary to remove the chassis from its cabinet in order to make any alignment adjustments. The alignment adjustments for the Intermediate Frequency circuits are accessible from the rear of the receiver, and the adjustments for the Radio Frequency circuits are accessible through the apertures located in the bottom metal base plate of the chassis. These apertures are easily accessible through the bottom of the cabinet shelf. Never align any of these receivers without having the metal base plate fastened to the chassis base.

### Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a counter-clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

### Intermediate Frequency and A. F. C. Circuit Adjustments

The intermediate frequency system employed in these receivers has a complex circuit arrangement. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch of the receiver to the "A" range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity Control to its "Normal" position, the Automatic Frequency control knob to the "Off" position and the "Off-On-Bass-Phonograph" control knob to its "Normal" position. Never attempt to align the R. F. or I. F. circuits of these receivers with the Fidelity Control knob set at any position other than the "Normal Fidelity" position, and the Automatic Frequency Control knob set at the "On" position unless specifically directed in the following paragraphs.
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6K7 tube used in the second I. F. amplifier, a modulated signal of 465 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6K7 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or ground binding post terminal.
3. Now, noting from Figure 1, the alignment adjustments for the I. F. circuits proceed in the following order:

Adjust the third I. F. transformer primary circuit for maximum output.

Adjust the third I. F. transformer secondary circuit for maximum output.

4. Remove the lead connecting the signal generator (through the 0.1 mfd. capacitor) to the grid of the No. 6K7 tube of the second I. F. amplifier and connect this lead to the grid of the No. 6K7 tube of the first I. F. amplifier; then align in the following order:
  - Adjust the second I. F. transformer secondary circuit for maximum output.
  - Adjust the second I. F. transformer primary circuit for maximum output.
5. Remove the signal generator lead connecting to the grid of the No. 6K7 tube of the first I. F. amplifier and connect it to the grid of the No. 6A8 modulator tube; then align in the following order:
  - Adjust the first I. F. transformer secondary circuit for maximum output.
  - Adjust the first I. F. primary circuit for maximum output.
6. Check all the above adjustments again with the signal generator lead connected to the grid of the No. 6A8 modulator tube and in the order as given above.

Carefully make all the above adjustments, carefully watching the output meter and reduce the output of the test oscillator as required.

### **Adjustment of the Discriminator Tuned Circuits**

To properly adjust the tuned circuits of the discriminator transformer, check the position of the A. F. C. Control knob which should be set to the "off" position. Before making this circuit adjustment be sure that the I. F. amplifier and signal generator are exactly in resonance at 465 kilocycles. Connect a high resistance voltmeter having a resistance of at least 1000 ohms per volt across the junction of the resistors R-37, R-38 and the chassis base. It is preferable to use the 500 volt scale of this meter in order that the load imposed on the discriminator circuit will not be too great. The D. C. milliammeter previously mentioned should be connected in series with the cathode of the No. 6J7 oscillator control tube exactly as described in the second paragraph of the Alignment Data. The signal generator should remain connected to the grid of the No. 6A8 modulator tube the same way as connected when making the aligning adjustments of the I. F. Amplifier circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube. Now, slightly detune the secondary circuit of the Discriminator transformer so that a fair voltage indication is obtained on the high resistance voltmeter connected across the junction of the resistors R-37, R-38, and the chassis base, and then adjust the primary circuit of the Discriminator transformer until a maximum reading is obtained on the voltmeter. Now, again adjust the secondary circuit of the Discriminator transformer so that zero reading is obtained on the voltmeter. Care should be taken that the meter does not read below zero.

**CAUTION:** In order to make sure that this adjustment of the secondary circuit of the Discriminator transformer has been correctly made, the adjusting screw should be turned gradually so that the indicator of the voltmeter will first return to zero, and then while continuing to turn this screw in the same direction, will go slightly below the zero mark, after which the screw should be turned in the opposite direction until the indicator is again brought back to the zero mark. If the above described condition cannot be obtained, this adjusting screw adjustment for the secondary circuit of the Discriminator transformer has been rotated in the wrong direction, and it will be necessary to carefully turn it in the opposite direction. After this adjustment has been made, it will not be necessary to use the voltmeter any more and it can be removed from the receiver circuit.

When the above adjustments have been carefully made, the milliammeter connected in the cathode circuit of the No. 6J7 oscillator control tube should be observed, and if the tuned circuits of the discriminator transformer are correctly adjusted there should be no difference in the reading of this milliammeter when the A. F. C. control knob is rotated from the "off" to the "on" position. If the above condition does not exist, the secondary circuit of the Discriminator transformer should be readjusted until the milliammeter has the same value regardless of whether the A. F. C. control knob is rotated to the "on" or "off" position.

### **Radio Frequency Adjustments**

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the A. F. C. Control knob should be rotated to the "off" position, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass-Phonograph" Control knob should also be set for "Normal" operation.

### **Alignment of Ultra-Short Wave Range (Also referred to as "E" Band)**

In order to align the circuits of this range, it is desirable to have a signal generator whose high frequency range will go to 60 megacycles. Such equipment, however, is rare and costly, and in most cases it will be necessary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

In aligning the radio frequency circuits for this range, replace the 0.1 mfd. capacitor which was placed in series with the signal generator's output lead for the I. F. alignment with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post marked "U. H. A." located on the rear of the receiver chassis. The ground terminal (or low side) of the signal generator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "E" range position and set the signal generator's frequency and the receiver's tuning dial to 60 megacycles.
2. Adjust the aligning capacitor C-46 until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 20 megacycles and adjust the "E" range trimming loop, L-54, until maximum voltage output is obtained on the output meter. The adjustment of this loop is obtained by distorting its normally circular shape until it offers the correct inductive effect. If the oscillator does not track with the tuning dial scale at this frequency, it will be necessary to also adjust the oscillator's tuning loop.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

### **Alignment of Short-Wave Range (Also referred to as "D" Band)**

In aligning the radio frequency circuits for this range use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminals of the signal generator as was used for aligning the Ultra-Short Wave Range. Connect this lead to the antenna binding post marked "A" located on the rear of the receiver chassis, and align as follows:

1. Operate the Range Switch on the receiver chassis to the "D" range position and set the signal generator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust aligning capacitors C-45, C-22, and C-8 respectively; and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 11 megacycles and adjust aligning capacitors C-40, C-25, and C-12 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 20 megacycles and repeat operation No. 2.

### **Alignment of Short-Wave Range (Also referred to as "C" Band)**

In aligning the radio frequency circuits for this range use the same artificial antenna and binding post on the receiver chassis as was used for aligning the "D" range.

1. Operate the Range Switch on the receiver chassis to the "C" range position and set the signal generator's frequency and the receiver's tuning dial to 10 megacycles.
2. Adjust the aligning capacitors C-44, C-21, and C-7 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 5 megacycles and adjust the aligning capacitors C-39, C-23, and C-11 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 10 megacycles and repeat operation No. 2.

### **Alignment of Aircraft Range (Also referred to as "B" Band)**

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Operate the Range Switch on the receiver chassis to the "B" range position and set the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles.
2. Adjust the aligning capacitors C-43, C-20, and C-6 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 1.8 megacycles and adjust the aligning capacitor C-38 and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles and repeat operation No. 2.

### **Alignment of Standard Broadcast Range (Also referred to as "A" Band)**

In aligning the radio frequency circuits for this range, replace the 400-ohm resistor in series with the signal generator's output with a 200-micro-microfarad capacitor and align this range as follows:

1. Operate the Range Switch to the "A" range position and set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles (1500 kilocycles).
2. Adjust the aligning capacitors C-42, C-19, C4, and C-5 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles (600 kilocycles) and adjust the aligning capacitor C-37; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation No. 2.

### **Adjustment of 10 Kilocycle Audio Cut-Off Filter**

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

## Instructions for Setting Up the A. F. C. Flash Tuning Unit

1. Remove the flash tuner lamp unit escutcheon plate by removing the four screws.
2. Remove the lists of station letters from the P-28420 package assembly which is tacked inside of the cabinet.
3. Remove the seven paper squares on which are printed the words "Tone", "Beauty", "Value", "Action", "Flash", "Tuning", and "Radio" from the square frames located on the rear side of the lamp unit escutcheon plate.

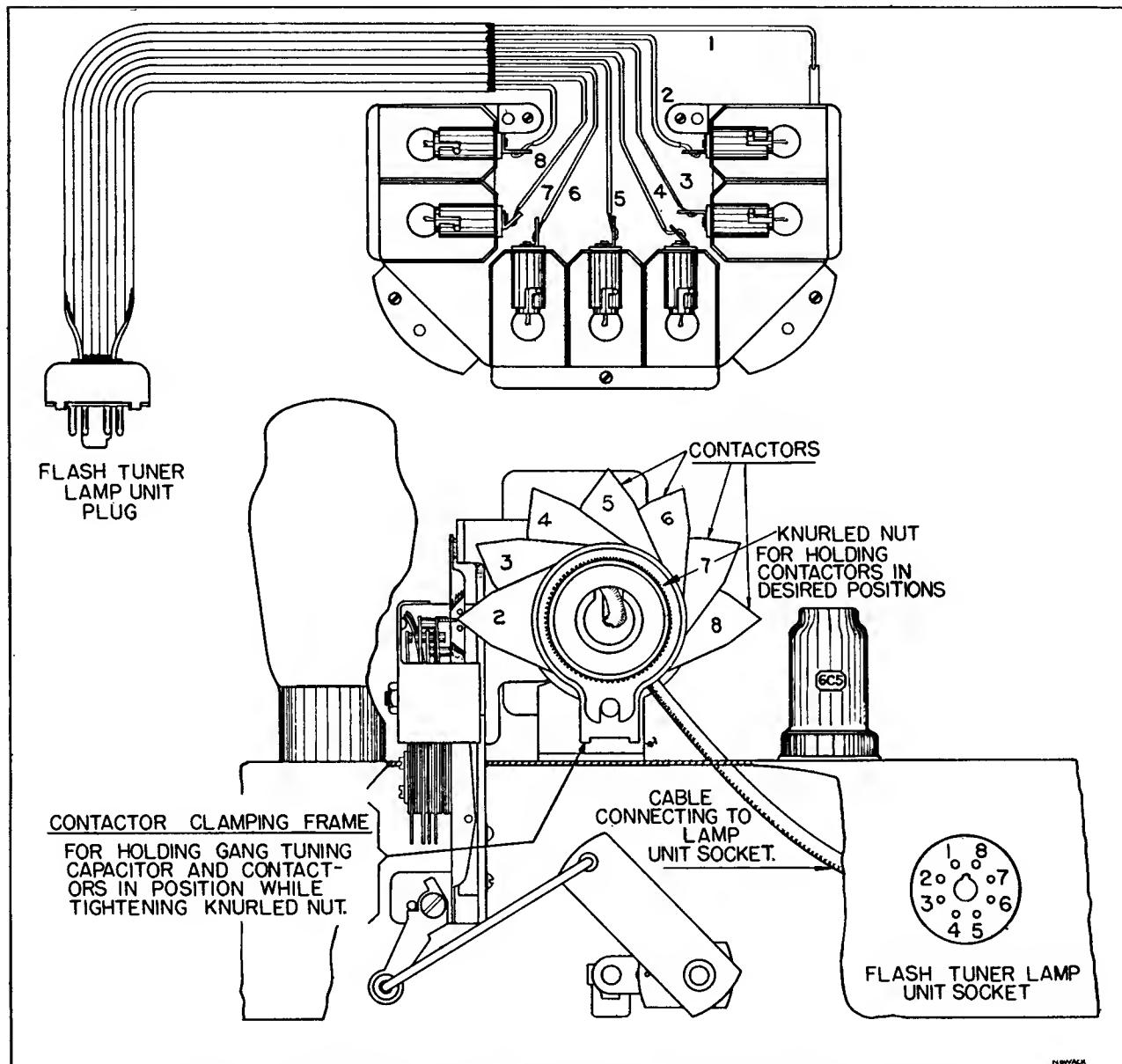


Fig. 3. Showing Flash Tuner Lamp Unit With Escutcheon Plate Removed (Top Figure) and Rear View of Receiver Showing Flash Tuner Mechanism (Bottom Figure).

4. Remove the station letters of the seven stations which it is desired to set up in the flash tuning unit from the list of stations. It will be noted that the letters of the stations are printed on partly cut squares to facilitate ease in removing the desired letters. Insert one of these seven station letters into each frame of the flash tuner lamp unit. The recommended method of inserting these station letters into the frames of the escutcheon plate is to arrange them according to the frequency of the stations as follows:

Looking at the front of the escutcheon plate the station having the highest frequency should appear in the top right-hand frame, and then in successive order according to frequency the remaining station letters should be inserted into the other frames; the top left-hand frame containing the station let-

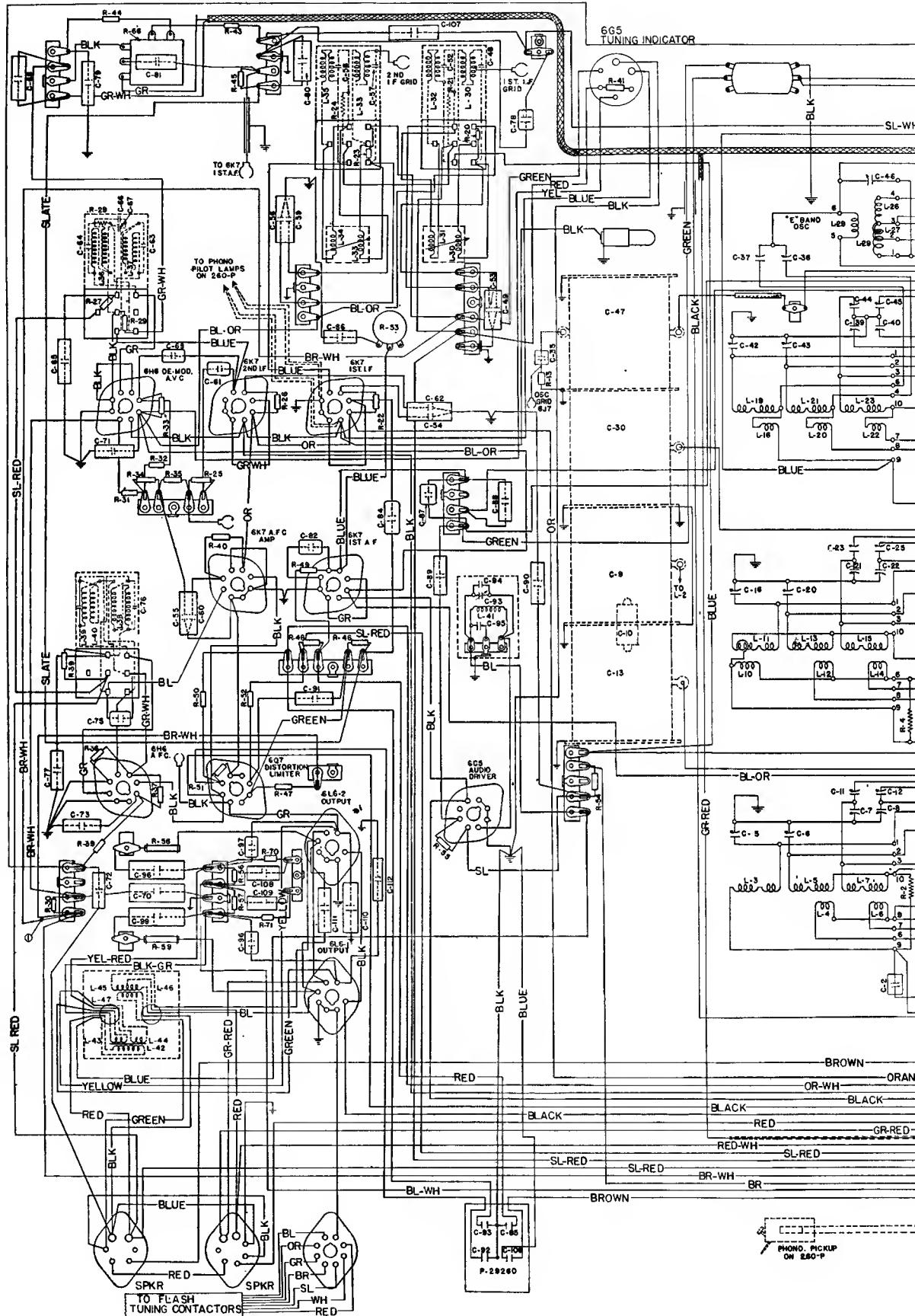


Fig. 4. Wiring Diagram.

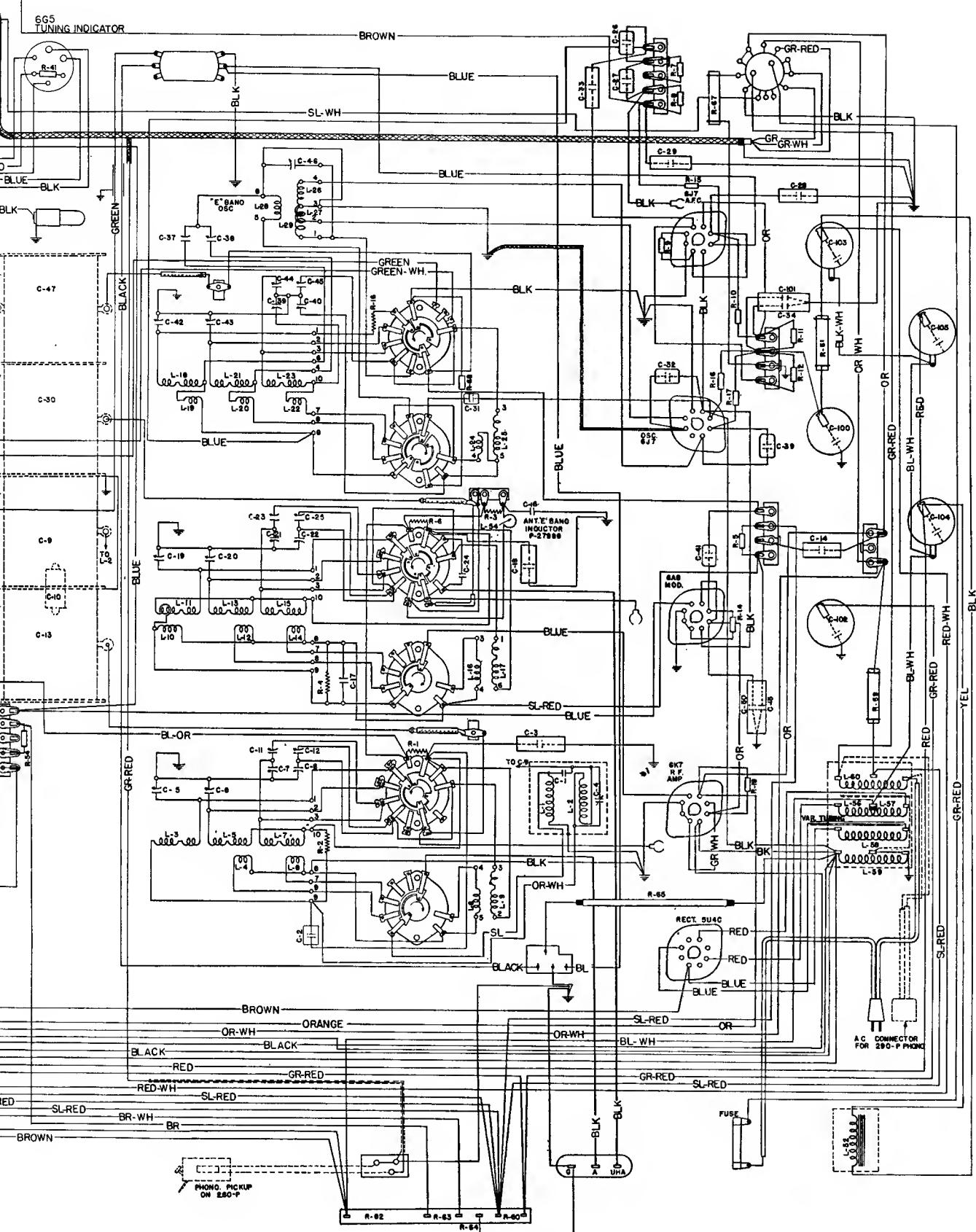


Fig. 4. Wiring Diagram.

ters of the station having the lowest frequency. In inserting these letters into the frames be sure to have the letters located between two pieces of transparent material.

5. Fasten the escutcheon plate again to the lamp unit by means of the four screws. The receiver is now ready to be operated and the flash tuning unit contactors located on the rear of the chassis base adjusted for the seven favorite stations.
6. Rotate the "On-Off-Bass-Phonograph" Control knob from its complete counter-clockwise position, slightly clockwise from this position which turns the set "on" (indicated by illumination of the dial). Allow the receiver to reach operating temperature (about 15 minutes) before proceeding with setting up the flash tuning mechanism. Check the position of the Automatic Frequency Control knob which should be rotated to the "Off" position, and set the Fidelity Control knob to the "Normal" position. Now carefully tune in the desired station having the highest frequency, watching the tuning indicator so that the receiver will be exactly tuned to this station.
7. After carefully tuning in the desired station rotate the A. F. C. Control knob to the "On" position. Now, noting from Figure 3, the sketch which shows the contactor clamping frame and knurled nut, hold the clamping frame with one hand and loosen the knurled nut with the other hand. Then move the contactor, numbered 2, so that its point is engaged between the two small rollers of the switching mechanism as also shown in Figure 3. When the point is properly engaged between the rollers, the lamp of the lamp unit which is located behind the station letters of the station being tuned in will light. When this condition is obtained, retighten the large knurled nut and at the same time securely hold the gang tuning capacitor and the contactors from rotating by means of the extended portion of the contactor clamping frame. It is extremely important to keep the gang tuning capacitor and the contactors from rotating when tightening the large knurled nut.
8. Now rotate the A. F. C. Control knob to the "off" position and note whether the tuning has been shifted by watching the tuning indicator. If a change is noted it will be necessary to repeat operation No. 7.
9. When no change is noticed after performing the above operations Nos. 7 and 8, the remaining six favorite stations should be set up in the same manner.

With the A. F. C. flash tuning unit in operation, the receiver will be automatically kept in tune with any one of the seven favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the flash tuning unit, it will be found that the Automatic Frequency Control will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

## PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A socket having three contacts is provided on the rear of the chassis base of the No. 260-L Receiver, and is wired to the "Off-On-Bass-Phonograph" switch assembly located on the front of the receiver. A three prong plug is also inserted in the socket so that if at any time it is desired to use an electric pick-up and phonograph unit in conjunction with this receiver, it may readily be accomplished.

In order to obtain the best quality of phonograph reproduction when using an electric pick-up and phonograph unit with this receiver, a Stromberg-Carlson No. 10 Record Player is recommended. This record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit. To attach this instrument to a No. 260-L Receiver, it is only necessary to remove the three-prong plug furnished with the receiver and insert the three-prong plug which comes with the unit into the three-prong socket located on the rear of the chassis base. Then, the power supply plug of the phonograph unit should be inserted into a suitable power supply receptacle, and the unit will be ready for use.

If the Stromberg-Carlson No. 10 Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong plug furnished with the receiver and the pick-up. This shielded cable should be of the low capacity type, in order to prevent the excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

## REPLACEMENT PARTS

Piece Number	Schematic Circuit Designation	Part
21984	.	Fuse Block Assembly
22974	.	Tube Socket, 6 Prong
23517	.	Tube Socket, 7 Prong
24268	.	Cord, Power Supply
24314	C1	Capacitor, Type "O", 10 Mmfd.
24402	C29, C86, C87, C89, C90	Capacitor, .1 Mfd.
24405	C3, C16, C18, C28, C55, C71	Capacitor, .04 Mfd.
24560	C66, C67	Capacitor, Type "O", 50 Mmfd.
24994	C15, C65, C77	Capacitor, .01 Mfd.
25149	C38, C79, C91, C107, C108, C109	Capacitor, .01 Mfd.
25150	C68, C81	Capacitor, .02 Mfd.
25451	C78	Capacitor, .002 Mfd., 400 Volts
25483	C72, C73	Capacitor, .1 Mfd., 400 Volts
25487	C31, C88, C94	Capacitor, Type "W", .001 Mfd.
25489	C95	Capacitor, Type "W", .00125 Mfd.
25539	.	Tube Socket, 8 Prong
26062	R61, R67, R69	Resistor, Type "F", 10,000 Ohms
26151	C110, C112	Capacitor, .005 Mfd., 400 Volts
26178	L51	P-36170 Loud Speaker Field Coil (1050 Ohms)

26250	L48	.	.	Voice Coil and Cone Assembly (P-26170 Loud Speaker)
26250	L49	.	.	Voice Coil and Cone Assembly (P-27827 Loud Speaker)
26287	.	.	.	Pilot Lamp
26322	R15	.	.	Resistor, Type "E", 120 Ohms
26326	R51	.	.	Resistor, Type "E", 270 Ohms
26333	R5, R19, R20, R23, R27, R39	.	.	Resistor, Type "E", 1000 Ohms
26343	R70, R71	.	.	Resistor, Type "E", 6800 Ohms
26345	R22, R26, R28, R40, R48	.	.	Resistor, Type "E", 10,000 Ohms
26349	R10, R11, R12, R17	.	.	Resistor, Type "E", 22,000 Ohms
26353	R4, R13, R14, R25, R43, R44	.	.	Resistor, Type "E", 47,000 Ohms
26357	R1, R3, R21, R24, R49, R52	.	.	Resistor, Type "E", .1 Megohm
26362	R29, R30, R55	.	.	Resistor, Type "E", .27 Megohm
26369	R33, R35, R41, R47	.	.	Resistor, Type "E", .1 Megohm
26371	R46	.	.	Resistor, Type "E", .15 Megohm
26373	R38, R45	.	.	Resistor, Type "E", .22 Megohm
26383	R2, R3, R6	.	.	Resistor, Type "E", .1 Megohm
26417	C10	.	.	Capacitor
26677	.	.	.	Plug for Phonograph Pickup
26678	.	.	.	Socket for Phonograph Pickup
26704	L52	.	.	Choke Assembly
26735	.	.	.	Antennas and Ground Binding Posts
26751	.	.	.	Switch Assembly, "Off-On-Rass-Phonograph" Control
26819	.	.	.	Fuse, 5 Amperes
27008	C36	.	.	Capacitor, Type "W", .006 Mfd.
27009	C32	.	.	Capacitor, Type "2", 500 Mmfd.
27073	C63, C64, C74, C76	.	.	Capacitor, Type "1", 100 Mmfd.
27101	C17	.	.	Capacitor, Type "0", 200 Mmfd.
27108	C14, C34, C49, C50, C54, C56,	.	.	Capacitor, Two, .05 Mfd.
27305	C59, C60, C62, C101	.	.	Capacitor, Type "0", 50 Mmfd.
27309	C24, C35, C41, C61, C69	.	.	Fixed Capacitor, 300 Mmfd.
27407	C48, C52, C57, C58, C75	.	.	Resistor, Type "ER", 22,000 Ohms
27588	R18, R50	.	.	Capacitors, Aligning
27589	C5, C6, C7, C8, C11, C12	.	.	Capacitors, Aligning
27590	C19, C20, C21, C22, C23, C25	.	.	Bi-Resonator Coil "A" Range, Antenna Transformer "R" and "C" Ranges
27592	L3, L4, L5, L6, L7	.	.	R. F. Transformer, "A", "B", and "C" Ranges
27593	L10, L11, L12, L13, L14, L15	.	.	Oscillator Transformer, "A", "R", and "C" Ranges
27594	L18, L19, L20, L21, L22, L23	.	.	Bang Switch Assembly
27608	L1, L2	.	.	Antenna Transformer, "A" Range
27643	L8, L9	.	.	Antenna Transformer, "D" Range
27644	L16, L17	.	.	R. F. Transformer, "D" Range
27645	L24, L25	.	.	Oscillator Transformer, "D" Range
27710	C9, C13, C30, C47	.	.	Gang Tuning Capacitor
27715	.	.	.	Coupling Assembly (Tuning Drive)
27720	.	.	.	Gear and Bracket Assembly
27781	.	.	.	Drive Assembly
27732	.	.	.	Mask Assembly
27733	.	.	.	Lever Assembly, Mask Actuator
27735	.	.	.	Rod
27737	.	.	.	Indicator Frame Assembly
27748	.	.	.	Dial
27751	.	.	.	Tube Socket, 8 Prong
27758	C26	.	.	Capacitor, Type "O", .75 Mmfd.
27761	R7	.	.	Resistor, Type "E", 620 Ohms
27762	R9	.	.	Resistor, Type "ER", 910 Ohms
27778	.	.	.	Switch, A. F. C.
27779	.	.	.	Crank Arm
27782	C2	.	.	Capacitor, .03 Mfd.
27877	L56, L57, L58, L59, L60	.	.	Power Transformer (50 to 60 Cycles Chassis)
27878	L56, L57, L58, L59, L60	.	.	Power Transformer (25 to 60 Cycles Chassis)
27882	C4	.	.	Capacitor, H. F. Aligner for "A" Range Antenna Transformer
27887	L30, L31, L33, L34	.	.	Coil and Bracket Assembly
27897	R53	.	.	Potentiometer, Tone Fidelity Control
27908	L50	.	.	P-27827 Loud Speaker Field Coil (3425 Ohms)
27914	L32	.	.	First I. F. Transformer
27915	L35	.	.	Second I. F. Transformer
27916	L26, L27, L28, L29	.	.	Oscillator Transformer, "E" Range
27921	C46	.	.	Capacitor, Aligner, "E" Range
27988	L54	.	.	Antenna Transformer Tuning Loop, "E" Range
27989	C37, C38	.	.	L. F. Aligners for "A" and "R" Range Oscillators
27994	.	.	.	Pilot Lamp Socket Assembly
27995	.	.	.	Cable Assembly (Tuning Indicator Unit)
27998	C27, C82, C96, C97	.	.	Capacitor, Type "O", 200 Mmfd.
28002	C70, C80, C84	.	.	Capacitor, .25 Mfd., 150 Volts
28005	R16, R68	.	.	Resistor, Type "E", .51 Ohms
28066	.	.	.	Cable Assembly, Phonograph Switch to Pickup Socket
28034	C39, C40, C42, C43, C44, C45	.	.	Capacitors, Aligning
28186	R81, R54	.	.	Resistor, Type "ER", .39 Megohm
28187	R34, R36, R37	.	.	Resistor, Type "ER", .47 Megohm
28189	R32	.	.	Resistor, Type "ER", .68 Megohm
28224	.	.	.	High Frequency Cut-Off Filter Assembly
28225	L41	.	.	Solenoid, High Frequency Cut-Off Filter
28231	L42, L43, L44, L45, L46, L47	.	.	Audio Input and Output Transformer Assembly
28256	C104, C105	.	.	Electrolytic Capacitor, 8 Mfd., 500 Volts
28257	C103	.	.	Electrolytic Capacitor, 16 Mfd., 500 Volts
28258	C102	.	.	Electrolytic Capacitor, 16 Mfd., 300 Volts
28259	C100	.	.	Electrolytic Capacitor, 16 Mfd., 300 Volts
28260	C83, C85, C92, C106	.	.	Electrolytic Capacitor, 4 Mfd., 100 Volts; 4 Mfd., 200 Volts; 12 Mfd., 20 Volts;
28264	R56, R57	.	.	12 Mfd., 50 Volts
28265	R58, R59	.	.	Resistor, Type "E", 10,000 Ohms
28265	R58, R59	.	.	Resistor, Type "R", 50,000 Ohms
28285	L36, L37	.	.	Third I. F. Transformer
28286	L38, L39, L40	.	.	Fourth I. F. (Discriminator) Transformer
28301	C93	.	.	Adjustable Capacitor, High Frequency Cut-Off Filter
28325	C98, C99	.	.	Capacitor, .1 Mfd., 800 Volts
28380	R60, R62, R63, R64	.	.	Resistor, "R" Voltage Divider
28389	R66	.	.	Potentiometer, Volume Control
28405	.	.	.	Connector Assembly
28410	.	.	.	Lever Assembly
28559	C111	.	.	Capacitor, .001 Mfd., 1600 Volts

### A. F. C. FLASH TUNER PARTS

24760	.	.	.	.	.		Spring Washer
28045	.	.	.	.	.		Lever
28053	.	.	.	.	.		Bod for Actuating A. F. C. Switching Mechanism
28054	.	.	.	.	.		Lever and Spring Combination
28088	.	.	.	.	.		Contactors' Assembly
28097	.	.	.	.	.		Contact Disc for Contactor
28098	.	.	.	.	.		Contactor
28099	.	.	.	.	.		Insulation Disc between Contactors
28100	.	.	.	.	.		Clamping Plate
28102	.	.	.	.	.		Blue Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102	.	.	.	.	.		Orange Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102	.	.	.	.	.		Green Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102	.	.	.	.	.		Brown Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102	.	.	.	.	.		State Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102	.	.	.	.	.		White Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28102	.	.	.	.	.		Red Wire of Cable Connecting to Flash Tuner Lamp Unit Socket
28296	.	.	.	.	.		Locking Ring Spring
28323	.	.	.	.	.		A. F. C. Switch Cable Assembly
28437	R59	.	.	.	.		Resistor, Flexible, 10 Ohms

### MISCELLANEOUS PARTS

27800	.	.	.	.	.		Knob Assembly (Used on Voirome, Range Switch and Off-On-Bass-Phonograph Controls' Shafts)
27801	.	.	.	.	.		Knob Assembly (Used on Fidelity and A. F. C. Controls' Shafts)
27802	.	.	.	.	.		Knob Assembly (For Rapid Station Selector Control Shaft)
27803	.	.	.	.	.		Knob Assembly (For Vernier Station Selector Control Shaft)
27628	.	.	.	.	.		Feit Washer (Used on Volume, Fidelity, Range Switch, A. F. C., and Off-On-Bass-Phonograph Controls' Shafts)
27630	.	.	.	.	.		Feit Washer (Used on Rapid Station Selector Control Shaft)

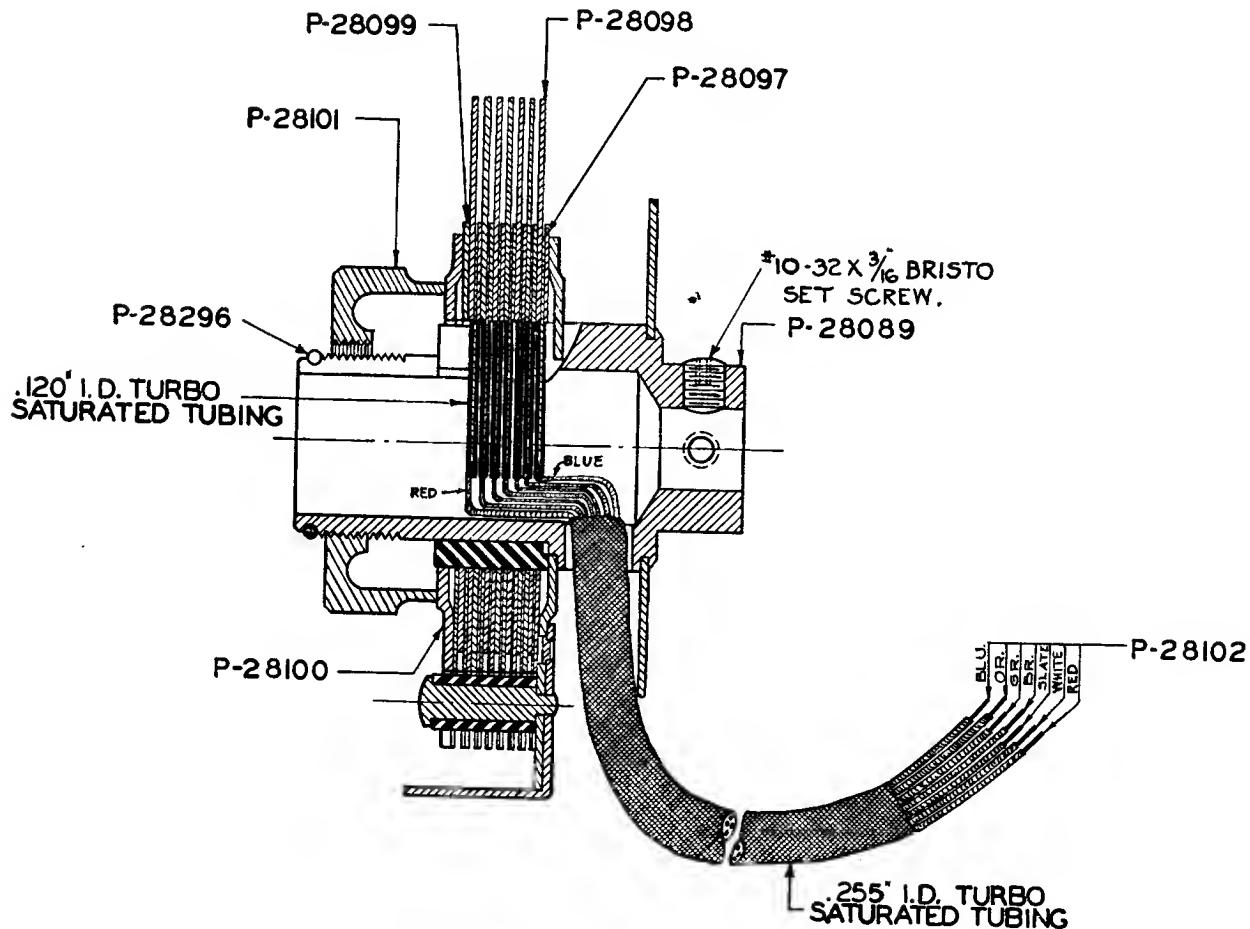


Fig. 5. Section View of Flash Tuner Contactors Assembly.

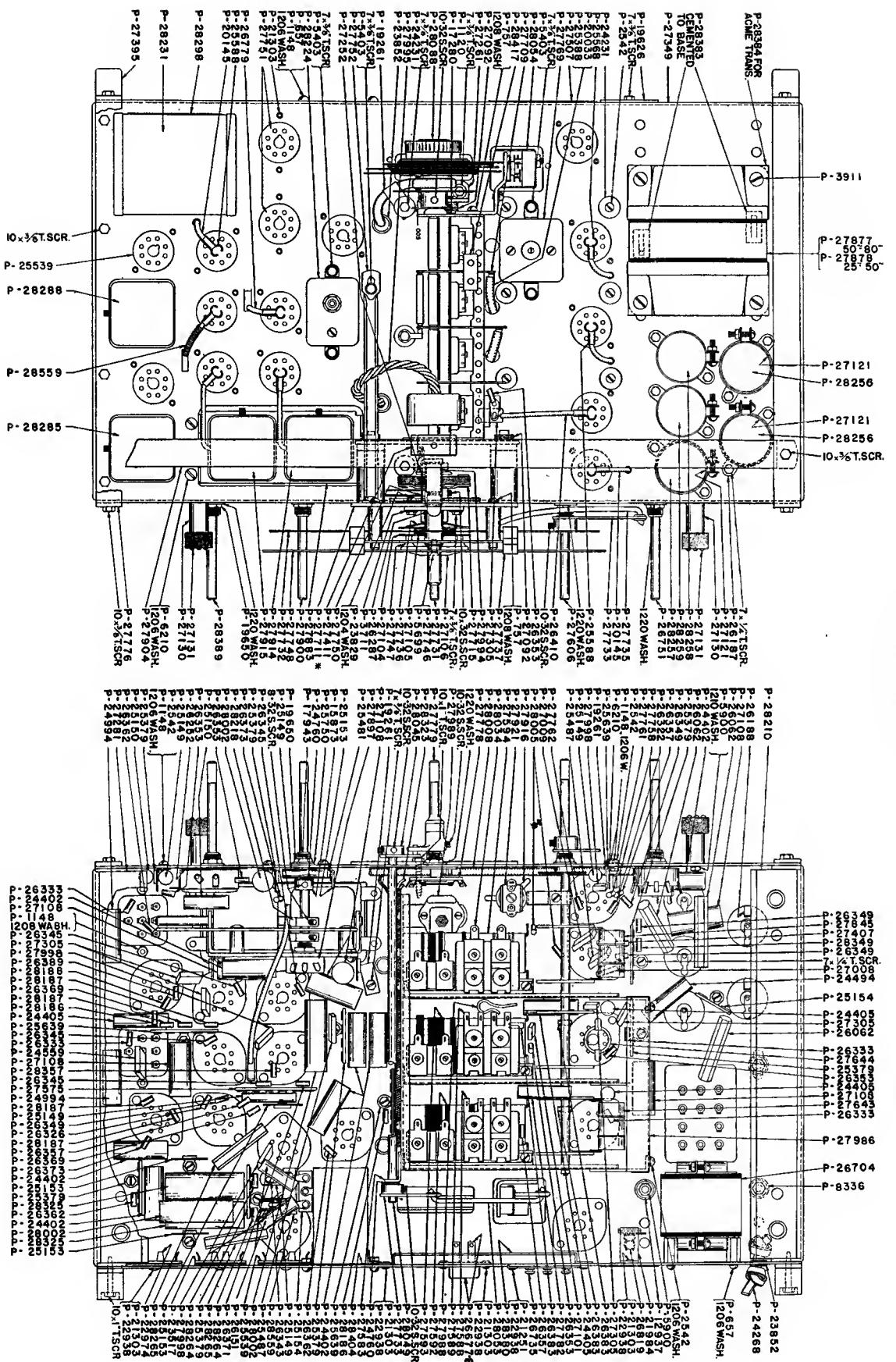


Fig. 6. Chassis Assembly.